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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/781,241	02/17/2004	Ali Keshavarzi	42P6184C	2359

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EXAMINER	
NGUYEN, JOSEPH H	
ART UNIT	**PAPER NUMBER**
2815	

DATE MAILED: 08/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/781,241	KESHAVARZI ET AL.	
	Examiner	Art Unit	
	Joseph Nguyen	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18 and 20-24* is/are pending in the application.

4a) Of the above claim(s) *25 and 26* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18, 20-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 4, 8, 12 and 15-18 rejected under 35 U.S.C. 102(b) as being anticipated by Houston.

Regarding claim 1, Houston discloses in figure 3 a field effect transistor comprising a substrate 134 (col. 4, line 25); a source and drain 120, 122 (col. 4, lines 8-9); an electric field terminal region 126 (col. 4, line 37) in the substrate 134; and a body 124 (col. 4, line 9) above the electric field terminal region between the source and drain, wherein there is a barrier 132 (col. 4, line 23) between the electric field terminal region and the body, wherein the electric field terminal region extends partially under the source and drain.

Note that although element 134 is buried dielectric, it can function as a substrate on which components of the field effect transistor is formed. Therefore, element 134 is considered "substrate". Further, element.126 has a structure similar to that of the claimed electric field terminal region, and element 126 functions to help to prevent source-drain punch through (col. 5, lines 50-53). Thus, element is considered "electric field terminal region".

Regarding claim 2, Houston discloses in figure 3 the barrier 132 is an insulator (col. 4, lines 22-23) between the body and the electric field terminal region.

Regarding claim 4, Houston discloses in figure 3 a field effect transistor comprising an insulator layer 132; a body 124 above the insulator layer between a source 120 and a drain 122; a substrate 134 below the insulator layer; a gate 116 (col. 4, line 16) above the body and between the source and drain, the gate having a length; and an electric field terminal region 126 in the substrate 134, wherein the electric field terminal region 126 extends partially under the source and drain.

Regarding claim 8, since the transistor as shown in figure 3 of Houston is structurally similar to the claimed transistor, it is inherent that a threshold voltage of the transistor of Houston is set by a distance between the insulator layer and a gate insulator.

Regarding claim 12, Houston discloses the electric field terminal is biased (col. 4, lines 30-33). Note that contact layer 138 is used to provide external connection to the field terminal 126, and when a voltage is applied to this external connection, the electric field terminal is biased.

Regarding claim 15, Houston discloses in figure 3 the electric field terminal region 126 extends beneath essentially the entire length of the gate 116.

Regarding claim 16, Houston discloses in figure 3 the electric field terminal region 126 extends only a portion of the gate 116 and another electric field terminal region 137 (col. 6, line 53) extends beneath another portion of the gate.

Regarding claims 17-18, the field effect transistor as shown in figure 3 of Houston can be formed as pMOSFET or nMOSFET.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Houston in view of Ayres et al. (US 5,684,318).

Regarding claims 3 and 5, Houston discloses in figure 3 substantially all the structures set forth in the claimed invention except the body being undoped. However, Ayres et al. discloses in figure 8 the body 111 being undoped (col. 6, lines 24-27). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Houston by having the body being undoped to significantly reduce the slow output drift in a transistor (col. 3, lines 1-2, Ayres et al.).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Houston in view of Hwang (US 5,359,219).

Regarding claim 6, Houston discloses in figure 3 substantially all the structures set forth in the claimed invention except the body being lightly doped. However, Hwang discloses on figure 1g the body 20 being lightly doped. In view of such teaching, it would

have been obvious to one of ordinary skill in the art at the time the invention was made to modify Houston by having the body being lightly doped to greatly inhibit the leakage current through thin buried oxide layers (col. 2, lines 10-13, Hwang).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Houston in view of Pfiester (US 5,426,315).

Regarding claim 7, Houston discloses in figure 3 substantially all the structure set forth in the claimed invention except the channel being undoped. However, Pfiester discloses the channel being undoped (col. 12, lines 29-34). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Houston by having the channel being undoped to reduce the off current at the drain region of a transistor (col. 12, lines 33-34, Pfiester).

Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Houston in view of Burr (US 6,249,027).

Regarding claim 9, Houston discloses in figure 3 substantially all the structure set forth in the claimed invention except the body being floating. However, Burr discloses the body being floating (col. 1, lines 59-60). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Houston by having the body being floating to tune the threshold voltage of a transistor (col. 1, lines 10-11, Burr).

Regarding claim 10, Houston discloses in figure 3 substantially all the structure set forth in the claimed invention except the body being biased. However, Burr discloses

the body being floating (col. 1, lines 59-60). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Houston by having the body being biased to tune the threshold voltage of a transistor (col. 1, lines 10-11).

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over figure 3 of Houston in view of figure 2 of Houston.

Regarding claim 11, figure 3 of Houston shows substantially all the structure set forth in the claimed invention except the electric field terminal being floating. However, figure 2 of Houston shows the body 326 being floating (col. 3, lines 57-59). In view of such teaching, it would have been obvious to one of ordinary skill in that art at the time the invention was made to modify figure 3 of Houston by having the body being floating to reduce junction capacitance (col. 2, line 6, Houston).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Houston in view of Inoue et al. (US 6,198,134).

Regarding claim 13, Houston discloses in figure 3 substantially all the structure set forth in the claimed invention except the substrate being floating. However, Inoue et al. discloses the substrate being floating (col. 2, line 45). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Houston by having the substrate being floating to lower the breakdown voltage between source and drain (col. 2, lines 44-45, Inoue et al.).

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Houston in view of Ng et al.

Regarding claim 14, Houston discloses in figure 3 substantially all the structure set forth in the claimed invention except the substrate being biased. However, Ng et al. discloses the substrate being biased (col. 1, lines 53-54). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Houston by having the substrate being biased to change the threshold voltage of a transistor (col. 1, line 60).

Claims 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang (US 5,359,219) in view of Houston.

Regarding claim 20, Hwang discloses in figure 1g a die comprising first and second field effect transistors (col. 2, line 59) each including a substrate 10 (col. 2, line 43); an electric field terminal region 16 (col. 2, lines 54-55) in the substrate, a source and a drain 52, 54 (col. 4, lines 20-21); and a body 20, 24 (col. 2, line 68) above the electric field terminal region between the source and drain. Hwang does not disclose the electric field terminal region extending partially under the source and drain. However, Houston discloses on figure 3 the electric field terminal region 126 extending partially under the source and drain 120, 122 (see rejection of claim 1 above). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Hwang by having the electric field terminal region

extending partially under the source and drain to prevent source-drain punch through (col. 5, lines 50-51, Houston).

Regarding claim 21, Hwang discloses on figure 1g an insulator layer 12 (col. 2, line 39) between the substrate 10 and body 20, 24.

Regarding claim 22, Hwang discloses on figure 1g the insulator layer is shared by the first and second field effect transistor.

Regarding claim 23, Hwang discloses on figure 1g the body is shared by the first and second field effect transistors.

Regarding claim 24, Hwang discloses on figure 1g the electric field terminal region is shared by the first and second field effect transistors.

Response to Arguments

Applicant's arguments with respect to claims 1-18 and 20-24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for

the organization where this application or proceeding is assigned is (571) 273-8300 for regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JN
August 1, 2005

TOM THOMAS
SUPERVISORY PATENT EXAMINER